

## **The embodied brain: cultural aspects of cognition**

*Abstract.* Our thinking is grounded in our sensory, motor, affective, and interpersonal experience. Recent psychological studies confirmed that our cognition is not only embodied but also embedded since it arises from interactions with its social and cultural environments, which makes it possible to create image schemas and conceptual metaphors. Those schemas facilitate acting in everyday, routine situations, but make it difficult to depart from them since they are frames that limit our ability to see the alternatives. They are intricately linked to our world view and, therefore, resistant to changes because the latter threaten the feeling of security.

This paper is aimed at evaluating people's ability to change the existing schema. In the study, participants were asked to create a completely new story based on two well-known stories in which they had previously inserted the missing words. It was found that most participants exhibited considerable difficulties in departing from the formerly established schemas. Moreover, the emotionally loaded story proved to be more difficult to change.

*Keywords:* cognitive schemas, bodily underpinning, cultural roots, schemas rigidity

*Introduction.* The rationalist tradition has dominated philosophy and psychology from the very beginning, which was closely linked to understanding cognition as processing of abstract symbols. However, recent studies have revealed that the ability of abstract reasoning, for example, solving logical problems is not an inborn capacity, and people rely on their mundane everyday experience in their reasoning. [1]. The inability to solve formal operation tasks was also observed in well-known experiments of Vygotsky and Luria [2] performed in Central Asia. It was shown that the reasoning of Asian nomads was based on their everyday experience. Our study also revealed that students are much better at solving mathematical and logical problems if they describe situations that are

close to life events [3]. Johnson [1] argues that all our cognition is underpinned by our sensory, motor, affective, and interpersonal experience and cognitive capacities that enable us to create image schemas and conceptual metaphors. Moreover, Tucker [4] posits that complex psychological functions arise from patterns of neural networks linked to bodily control and emotional networks. The work of those networks is subconscious and primary to cognitive processes and they are believed to be responsible for the formation of schemas of thought. These schemas or patterns form our mental habits in the way similar to such skills as speaking a given language or driving a car. In other words, our cognition depends on how our brain and body works and on patterns of our bodily interplay with the social and cultural milieu. The contemporary neurobiological studies confirm Luria and Vygotsky's assumption of social and cultural roots of cognitive functions. Since the above-mentioned schemas are a kind of mental habits, they are resistant to changes, which may create considerable difficulties in adopting to entirely new circumstances. Hence, this study is aimed at evaluating whether previously established schema could be changed or not.

*Materials and methods.* The study comprised 175 students of secondary and tertiary education levels. Two well-known stories were used: a gospel story of *The Woman Caught in Adultery* and Aesop's fable *The Fox and the Goat*. The participants were asked to insert missing words in these stories. Afterwards, they were asked to create a completely new story by filling in the same slots as in the former stories. On their part, it requires a capability to depart from the preformed schema. In addition, the Raven Test was administered to evaluate the level of abstract thinking of the examined subjects.

*Results.* A significant correlation between the ability to depart from the schema and the level of abstract thinking was found for the whole group. Yet all participants had considerable difficulties when trying to depart from the once formed schema regardless of their education level, age, and gender. At the same time, the emotionally loaded gospel story turned out to be more resistant to changes.

*Conclusion.* Schemas tend to remain invariable despite our conscious efforts to change them due to their habitual nature and due to the fact that they serve us well enabling efficient and effortless action. On the other

hand, well-established schemas often make it impossible to change our routines, attitudes, and beliefs to adapt to the changing external conditions. People tend to adhere to the once established schemas since these schemas constitute a significant part of their world view, which is deeply rooted in their culture. Moreover, cognitive schemas are not only 'flavored' but also underpinned by emotions that arise from bodily sensations [5]. Therefore, any changes violate our sense of order and threaten the very integrity of our environment and the self.

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